The Institute Spokesman

Published by

NATIONAL LUBRICATING GREASE INSTITUTE

VOLUME X NUMBER 6 SEPTEMBER, 1946

Centralized Lubrication*

By A. J. Jennings
The Farval Corp., Cleveland, Ohio
(Continued from August Issue)

Figure 7

gure 7 shows one type of central pump- unit consisting of a manually operated ger pump, a flow directing valve, a wer plate type of reservoir, and is com- with pressure gauge and fill con- ion.

large majority of the centralized grease em installations consist of the simple ually operated unit. Complete lubrica- of all bearings can be accomplished less than one minute, and when one ap- ation every four hours will provide er lubrication to the bearing, the more ensive full automatic system is not re- red.

Where conditions demand the renewal lubricant at frequent intervals, the power en automatic system with time clock trol may be employed. This type of ral pumping unit is illustrated in Figure An electric time clock starts the motor en pumping unit and after all grease

> ### IMPORTANT ANNOUNCEMENT
>
> *Effective with this notice, please address all mail directed to the attention of the Executive Secretary or the Editor of "The Institute Spokesman" to Mr. Carl E. Bolte, Executive Secretary, Land Bank Building, Kansas City 6, Missouri.*

measuring valves have operated, an additional pressure is built up at the end of the system in order to operate the flow reversing valve located at this point.

Operation of the flow reversing valve shuts off the pump motor, and ports one main supply line connection to relieve to the reservoir, while at the same time its also ports the outlet from the pump to the alternate main supply line. Therefore, when the clock again starts the pump motor, lubricant will be directed into the alternate main

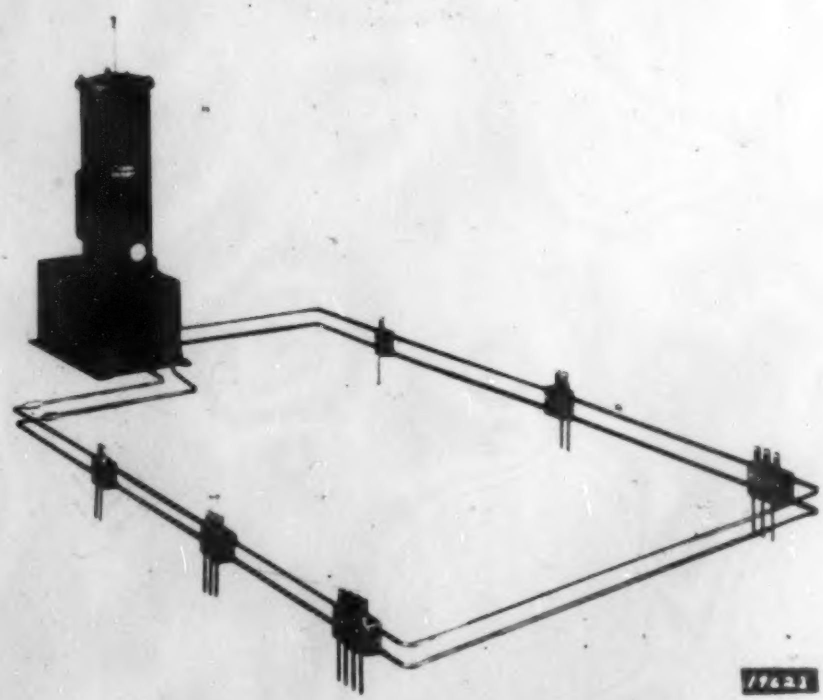

Figure 8

*urtesy Lubrication Engineering.

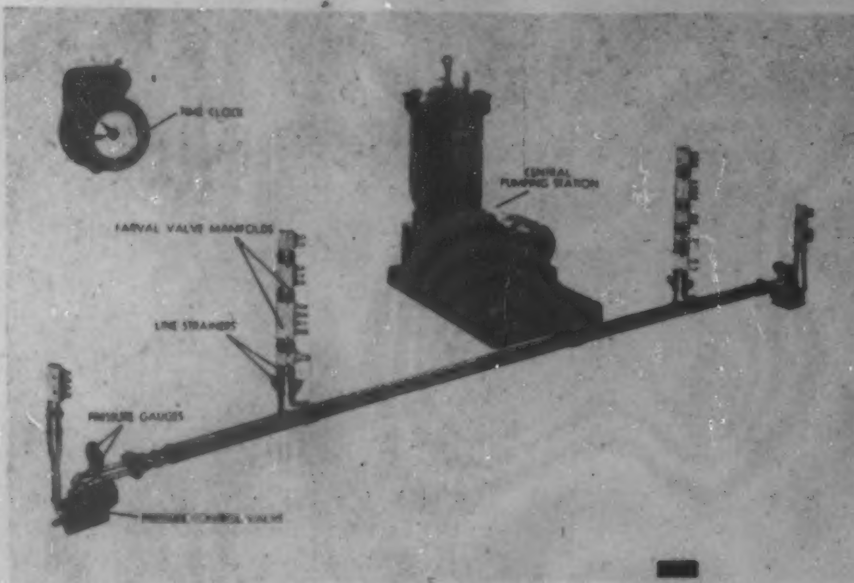

Figure 9.

upply line leading to all lubricant measuring valves. This unit is also furnished with otary drive for operation from a shaft on he machine being lubricated and thus will tart and stop with the machine it serves.

The large heavy duty automatic central pumping unit shown in Figure 9 will hold as much as 550 pounds of lubricant and was developed primarily for use on roll necks in the steel industry and for all types of rolling mill equipment. This type of system is being employed for the lubrication of the mills, tables, coilers, and conveyers, and it provides a positive, dependable method of lubricating a large number of bearings over a wide area from one central point. It is common practice to serve several hundred bearings by this method and on some installations as many as two thousand bearings are lubricated from one central unit. As a matter of fact, entire steel plants with 15,000 or 20,000 bearings are equipped with this type of centralized lubricating system, and including 300 to 400 systems of both manual and automatic types.

The automatic heavy duty unit is also being used extensively for the lubrication of rubber mills, calenders and mixers, and many complete plant installations have been made in this industry some of which involve several thousand bearings. Other applications include kilns, gold and tin dredges, forging machines, shell lathes, brick presses, group installations of metal stamping presses, etc.

Pumpability of Greases

In considering the installation of any extended centralized system of grease lubrication such as is illustrated for the table roll bearings in Figure 10, careful consideration must be given to the pumpability of the lubricant to be distributed. It may be possible, for example, to pump a certain type of grease from the Stevens to the Palmer House but we all know you cannot pump it from there to Waukegan and somewhere between these points there is a practical maximum distance beyond which you cannot go.

In the first place, none of the standard mechanical or hydraulic handbooks contain any information or charts pertaining to the pumping of plastics or semi-fluid lubricants. All of the available information, therefore, has had to come from field installation experience with the various greases and from the tests that have been conducted by the system manufacturer plus those made by several of the lubricant suppliers.

In considering this problem there are four principal factors to be considered—the consistency of the lubricant—the rate of flow—the temperatures to be encountered—and the area to be served by the system. These factors determine the pipe size required to provide proper distribution without developing excessive pressures in the system.

Experience has shown that some lubricants will develop soap separation at higher pressures and in any event, excessive pressures should be avoided because they put an unnecessary strain on the piping and fittings, put an extra load on the pumping equipment, and of course consume power. Our field experience indicates it is desirable to have a maximum system pressure of no more than 1200 to 1500 psi. As it is desirable to have 600 to 700 psi available to deliver the lubricant to the bearings, the system piping should not offer a resistance of more than 700 or 800 psi.

Where lower temperatures are encountered, auxiliary heating may be necessary but

Figure 10

The INSTITUTE SPOKESMAN

Published monthly by

he National Lubricating Grease Institute

eorge W. Miller .... *Editor*
8 Winspear Ave., Buffalo 15, N. Y.

en it is employed care must be taken avoid overheating or cooking. For example, experience has shown that a steam acer line laid parallel to the grease supply es should not be permitted to come in ect contact with them, but that all heat nsfer should be by radiation. Likewise, e steam and grease piping should not be vered with insulation or otherwise wrapped gether or over-heating may occur.

Experience has indicated that to avoid y possibility of soap separation through er-heating, the temperatures should be ld at 100 F or less.

Another very successful method for arming the main grease supply lines consts of the use of an electric hot bed cable rapped around the grease piping and conolled by a thermostat. In this case, the ping should be covered with an insulating aterial as the thermostat will prevent exssive temperatures or overheating and by e same token the current consumption ill be held to a very nominal amount.

The two methods outlined above for heatg the grease supply lines have been found be successful on Blast Furnace Tops d other outdoor installations.

Many very excellent low temperature eases that can be readily pumped without xiliary heating have been developed in

Figure 11

the past few years, and even with standard greases where temperatures do not go below 40 or 50 F no heating is necessary. With the run of mine variety of grease, however, where temperatures drop below 30 to 40 F, heating is normally required. With experience to indicate that temperatures should not exceed 100 F and pressures per square inch should not exceed 1500 pounds, it was necessary to determine the resistance offered by the different greases when pumped at a given rate of flow through the standard pipe sizes.

Based on the records obtained from hundreds of field installations and combined with our tests of a wide variety of industrial lubricants, we have been able to prepare the following chart as a dependable guide for the selection of the proper pipe size and to determine the maximum permissible length of the supply lines.

PIPE SIZE	PRESSURE DROP PER FT., P.S.I.
⅜"	28.8 lbs.
½"	18.5 lbs.
¾"	9.4 lbs.
1"	6.4 lbs.
1½"	2.7 lbs.
2"	1.6 lbs.

The above chart is based on pumping standard industrial lubricant having an ASTM worked penetration of 275 at 77 F at the rate of 10 oz. per minute and with the lubricant at a temperature of 60 F.

System for Small Machines

In contrast to the heavy duty units, a small junior system as shown in Figure 11 is also available for smaller machine equipment. You will note this junior valve employs the same positive displacement principle of measurement as the larger valves, that it is free from springs or check valves, is fully adjustable for quantity and contains but two moving parts. This unit will distribute either oil or grease and is being employed for the lubrication of printing machinery, packaging machinery, wire forming machines, textile machines, glass and can machinery, and on many types of small machine tools.

The complete line of centralized equipment also includes the multiple measuring valve block shown in Figure 12. This unit is designed for use with any conventional type of portable grease gun, to serve a limited number of bearings where the complete system with its permanent central pumping unit would not be justified. From two to twelve bearings can be served from one block and the unit will handle either grease or oil. The stroke of each piston is adjustable to provide delivery of an exact

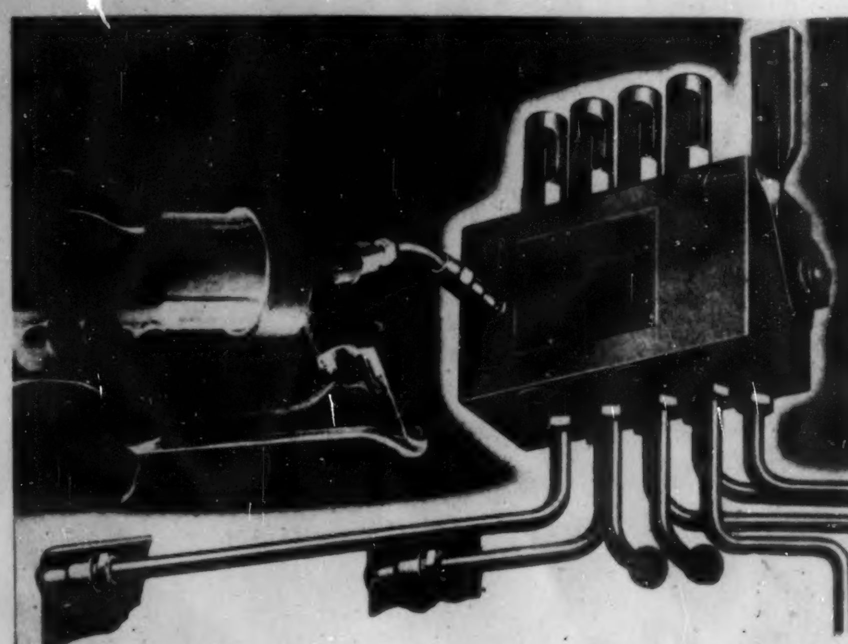

Figure 12

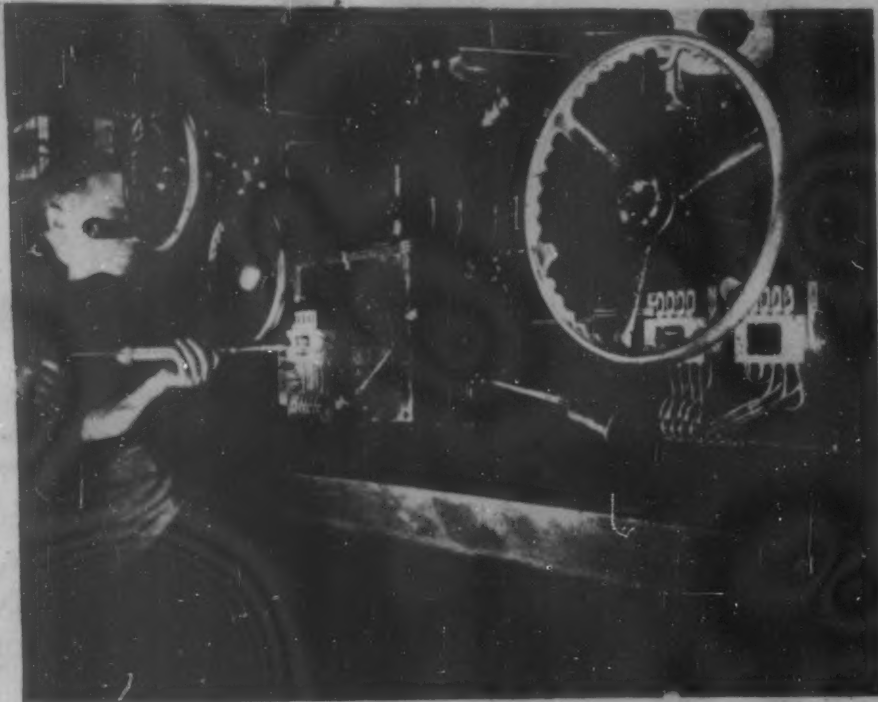

FIGURE 13

amount of lubricant with each operation and there is a tell-tale indicator to show the job is done.

The multiple valve block in effect puts positive control between the oiler's grease gun and the bearing and permits him to lubricate several bearings from one gun connection. This unit is being widely used for the lubrication of the smaller inclinable and single crank presses and for lubricating isolated groups of bearings on many of the larger tools and equipment.

Figure 13 shows an application of the multiple measuring valve block to a Warner and Swasey turret lathe where the bearings on the individual sections of the machine are being served from the several valve groups.

OVERHEAD CRANES (FIG. 14)

An overhead travelling crane is one place where a centralized system of lubrication can perform a real service from the standpoint of safety, reduced maintenance, and continuity of operation.

The early installations were made primarily to provide safety for the oiler and to eliminate the hazard of a man climbing

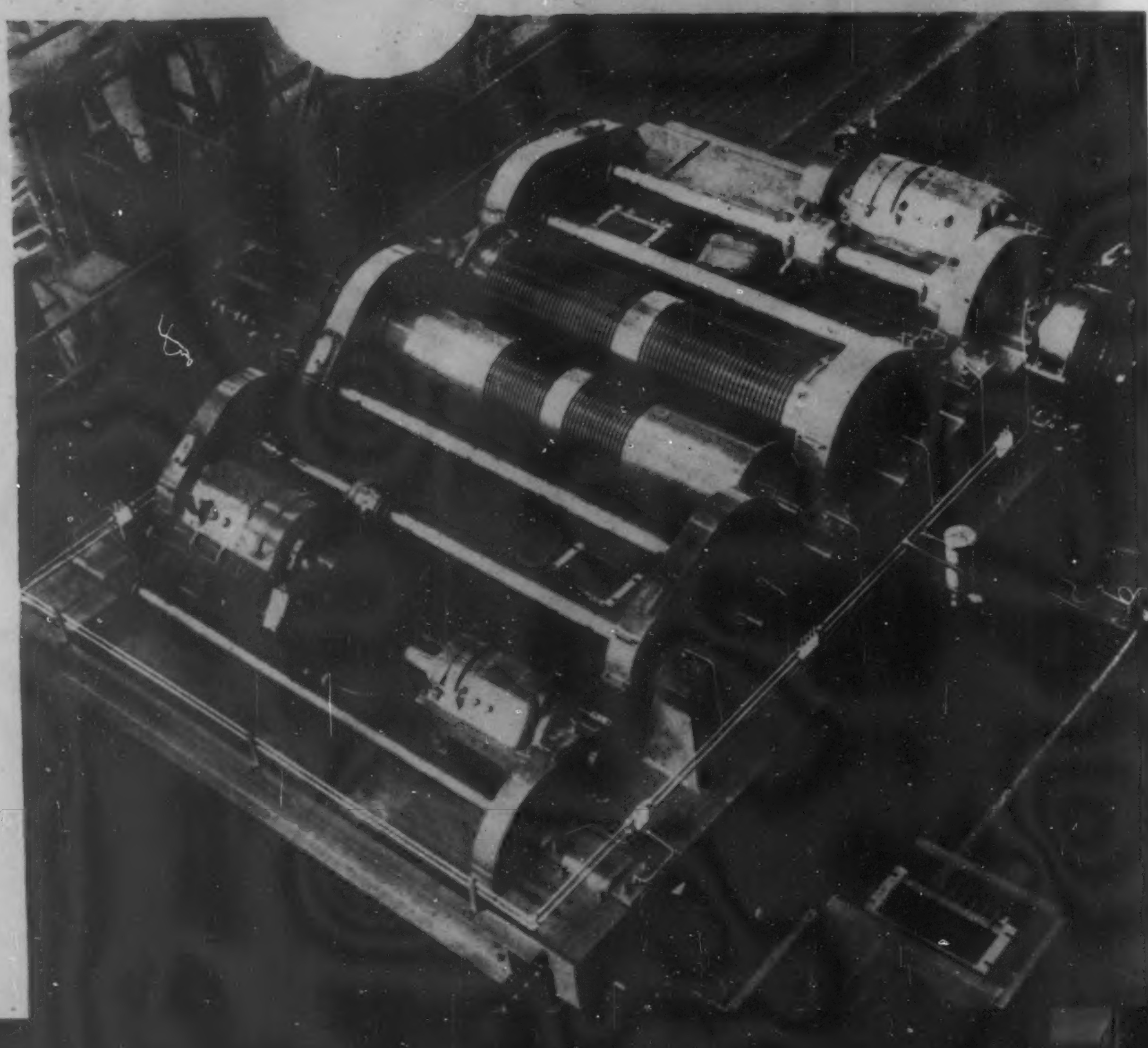

FIGURE 14

all over the cranes to reach each individual bearing. For example, an operator recently was killed when he slipped and fell while in the process of lubricating his crane. The man left a family behind and the accident resulted in an $18,000 compensation claim. This tragedy could have been prevented by a centralized system of lubrication.

These early installations soon revealed that better lubrication with the centralized system provided economies to more than justify the cost of its installation.

In the first place, a crane is overhead and no one can very well supervise its lubrication. When left to the individual, no one knows whether the crane has been lubricated or not until something goes wrong.

Many production shops today make certain that the bearings on machinery and equipment located at floor level are protected by some form of contralized lubrication. We believe you can appreciate how much more important it is to protect the bearings on the overhead equipment where supervisory control of the human element is not obtained.

(To be continued)